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## **Nonwoven Material for Coating Carpet Backs**

The invention involves a nonwoven material for coating carpet backs, comprising a nonwoven bonded with the aid of multiple loops of warp threads.

It is generally known that a nonwoven material for the backcoating of a floor covering is produced by piercing a prebonded or non-bonded nonwoven on a sewing machine by a series of compound pointed needles. Warp threads are placed in the hooks for the needles. The needles form loops and enclose fibers of the nonwoven between the shanks of the loops and the sinker loops. These fibers, which, as a rule, extend over three or more wales, give the goods – generally known as maliwatt stitch-bonded fabrics – adequate tensile strength in the transverse direction. Nonwovens of staple fibers are generally used for producing such nonwoven materials. For this application, these staple fibers were obtained by the mechanical opening of used textiles. The field of use was limited, because such coated floor coverings were not sufficiently skid-resistant. The fibers of the nonwovens thus produced were quite short staple fibers. The tensile strength of the coating left much to be desired.

For this reason, back coatings in the past were conducted predominantly with foam materials. In addition to stabilizing the carpet shape, advantages were also attained from the standpoint of walking comfort and safety against carpet skids. However, significant problems arose in recycling the carpet materials.

Among others, DE-PS 28 53 385 discloses a bonded nonwoven of synthetic fibers or filaments for the back coating. A continuous filament, polypropylene, nonwoven material comprising two layers is attached by needling, bonded and fixed in place on the back of the carpet by components that become adhesive when heated.

In doing so, difficulties arose in applying a high temperature to the sites where thick layers must be adhered. This did not succeed for large-scale commercialization. For these reasons, foam coating was preferred.

However, foam coating has, as just shown, significant disadvantages in recycling carpets.

These facts are the basis for the problem involved in the invention. It comprises proposing a back coating for floor coverings that can be produced economically, that enables reliable bonding with the back of the carpet, that enables shaping for walking comfort, that stabilizes the shape of the carpet and that can be recycled together with the base cloth and the pile layer.

In the invention, nonwoven material for the backing layer is formed according to the features of Claim 1. The costs of the continuous filament nonwoven and the sewing step are low and about comparable with the foam layer. Stuffing the spun-bonded material within the loops creates, on one hand, adequate tensile strength in the nonwoven. On the other hand, the nonwoven bulks among the bonding sites and forms voluminous areas that affect walking comfort positively.

The use of film tapes stabilizes the backing in the warp, filling and diagonal direction as a whole, reduces the costs for the warp threads and simultaneously opens the possibility of reliable bonding of the nonwoven material with the carpet back.

The tapes of atactic polypropylene permit a reliable bond between carpet backs and coatings without the use of additional adhesives.

Implementation according to Claim 3 ensures a justifiably good bulkiness in the nonwoven material for the coating at optimum nonwoven speeds.

The alignment of the loop shanks of the nonwoven material to the carpet back has the advantage that the bond between the carpet and the nonwoven material also secures the loops of the nonwoven material and prevents loosening of the back coating.

The invention is explained in more detail in the following example. The associated drawing shows a cross-section through a pile layer coated according to the invention.

In this example, the loop pile is pulled through the base fabric 1 in a known manner by the tufting process to form loops. In this manner, the pile layer 2, which essentially ensures the appearance of the floor covering and walking comfort, is formed above the base fabric.

On the underside of the floor covering, the connecting segments of the loop pile run from one needle hole to the next parallel to the bottom surface of the base fabric. Stitch-bonded fabric 3, 40 is applied to the coating of the carpet back under the base fabric for further improvement of walking comfort.

This stitch-bonded fabric 3, 40 comprises a spun-bonded nonwoven 3, also called a filament nonwoven, that was bonded by multiple wales 40 according to the known maliwatt process. The wales 40 are formed advantageously from polypropylene tape 4. In this process, the spun-bonded nonwoven is fed in at an essentially higher rate than the maliwatt knit fabric is withdrawn from the loop-forming zone.

In this manner, the spun-bonded nonwoven 3 is tied into each loop 40 in a more or less loop-like position. The fibers of the spun-bonded nonwoven 3 are thus gripped in the area of each wale. The spun-bonded nonwoven 3, 40 acquires high tensile strength in the filling direction. Stability in the warp direction is ensured by the wales 40 of polypropylene tape.

The volume of the stitch-bonded fabric is increased quite considerably in each loop 40 by the stuffed spun-bonded nonwoven 3, in particular between the individual wales. The resulting tread comfort is comparable throughout with a foam coating.

The bonding between the stitch-bonded nonwoven 3, 40 and the carpet base fabric 1, 2 results in the present example from the application of an adhesive 5 and by heating both areas to be bonded.

If an atactic polypropylene is used for the tapes and the areas to be bonded are heated enough to convert the tapes into a plastic form, the stitch-bonded nonwoven 3, 40 can be bonded in a known manner firmly with the carpet back.

The stitch-bonded nonwoven 3, 40 thus applied stabilizes the carpet back and imparts additional elasticity. The additional elasticity can be varied within wide limits by the weight per unit area of the spun-bonded nonwoven 3.

It has been shown to be advisable to vary the thickness of the stitch-bonded fabric between 2 and 5 mm.

This variation can be ensured by varying simultaneously the feed of the spun-bonded nonwoven 3 with varying weight per unit area or by the rate difference between withdrawing the goods from the stitch-bonding step and the feed rate of the spun-bonded nonwoven.

Trials have shown it to be advisable to use a spun-bonded nonwoven of  $40 - 60 \text{ g/m}^2$  and a loop length of about 1.5 – 2 mm, whereby the feed rate of the spun-bonded nonwoven is twice as high as the withdrawal rate of the nonwoven material 3, 40.

The type of the carpet 1,2 is not tied to a specific form or production technology. The presence of a fairly stable base material and the presence of a tuft or pile layer are decisive in essentially determining the appearance of the carpet and walking comfort.

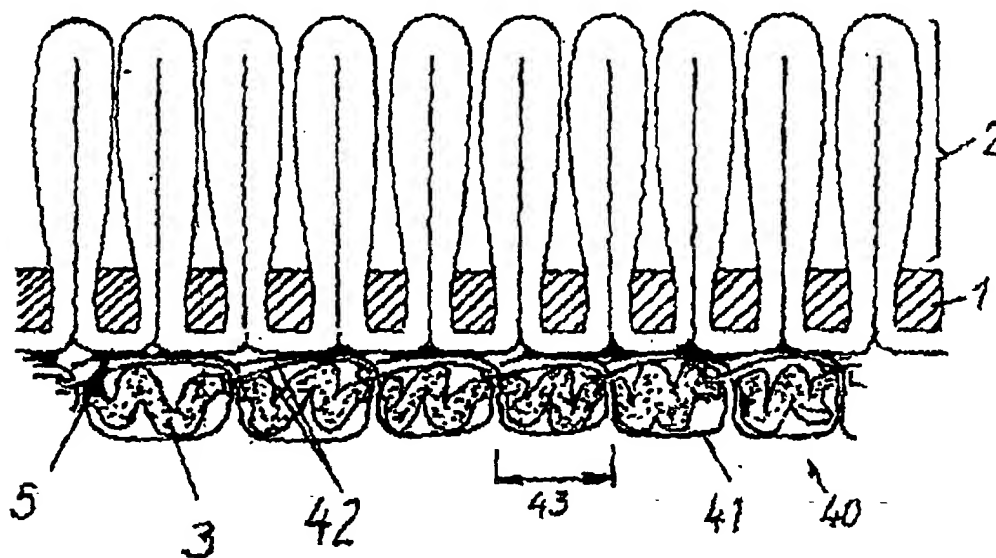
Adhesive tapes having adhesive on both sides can be used to improve the adhesive strength of the coated carpet on its underlayer. It is also possible to spray the left side of the backing 3, 40 – the side having the sinker loops 41 – with an agent that clearly increases the coefficients of friction on the usual underlayer of the carpet. It has been proven advantageous to

face the stitch side 42 of the stitch-bonded fabric to the back side of the carpet. It is particularly efficient if the bond between stitch-bonded fabric and carpet back is ensured with adhesives.

In this case, these adhesive materials simultaneously make secure the stitches 40 of the stitch-bonded fabric 3, 40 and prevent loosening of the coating.

#### List of Reference Numbers

- 1 Base fabric
- 2 Pile layer
- 3 Spun-bonded nonwoven / filament nonwoven
- 4 Warp threads / film tapes
- 40 Stitch / stitch wale
- 41 Sinker loops
- 42 Needle loop / loop shank
- 43 Loop length
- 5 Adhesive bond
- 3, 40 Stitch-bonded fabric / nonwoven material
- 1, 2 Carpet



#### Claims

1. Nonwoven material for coating carpet backs, comprising a nonwoven that is bonded with the aid of multiple loops of warp threads, characterized in that the nonwoven is a bonded

filament yarn nonwoven (3) having a weight per unit area between 20 and 200 g/m<sup>2</sup> and the warp threads comprise film tapes (4).

2. Nonwoven material according to Claim 1, characterized in that the film tapes comprise atactic polypropylene.

3. Nonwoven material according to one of Claims 1 and 2, characterized in that the bonded filament yarn nonwoven has a weight per unit area between 40 and 60 g/m<sup>2</sup> and the nonwoven is longer between two consecutive needle holes than the surrounding loop.

4. Nonwoven material according to one of Claims 1 to 3, characterized in that the loop shanks face the carpet back.

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